

**IMPROVED DATA INPUT****5 Background of the Invention**

The present invention relates to the field of portable radiotelephones, and more particularly, for inputting data into such devices.

- 10 Current portable radiotelephones provide a host of features in addition to that of making and receiving telephone calls. Such additional features include the storing and retrieving of telephone numbers and names from an internal phone book, to the sending of textual messages to other users.
- 15 Current portable radiotelephones generally comprise at a least a numeric keypad, for composing telephone numbers, and a number of additional function keys, for initiating communications to a desired telephone number, turning the radiotelephone on and off etc. It is also common for the numeric keypad to also contain alphabetic representations, for allowing the
- 20 construction of textual messages. Typically, each numeric key represents three alphabetic characters, for example, the numeric key '2' often also represents characters 'A', 'B' and 'C'. During the construction of a textual message, each press of a numeric key causes a display to cycle through each character represented by that key. For example, a first press of numeric key
- 25 '2' would cause the character 'A' to be displayed, a second press would cause the character 'B' to be displayed and so on. When the desired character is displayed, a further character may be entered either after a short delay, or by pressing another key. In this way textual messages may be constructed. A textual message may then be transmitted to another user in a variety of ways
- 30 which will be apparent to those skilled in the art.

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## Summary of the Invention

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The items may, for example, include menu options or functions. Alternatively, they may include a character set.

When the items are characters, the invention has the advantage of allowing  
 5 easy entry of alphanumeric data into a portable radiotelephone without  
 requiring a large keyboard. Additionally, the requirement for multiple presses  
 of numeric keys associated with alphabetic characters is also removed. The  
 present invention is particularly advantageous for portable radiotelephones or  
 similar devices which do not have a keyboard due to their small size. In  
 10 addition, the present invention provides a quick, accurate and efficient way of  
 entering data in a single-handed operation.

The present invention also has advantages over pen-entry systems, such as  
 character recognition systems, wherein a pen-like element is wiped over a  
 15 touch sensitive pad and a controller attempts to interpret the movements  
 made in order to recognise the character being written. These systems are  
 inherently slow and difficult to use and require the user to make precise  
 movements to ensure the correct character is recognised. Failure to make  
 precise movements often leads to the recognition of an erroneous character.  
 20 In such systems, the pen-like element is easily lost, rendering data input  
 extremely difficult.

Advantageously, the number of selectable choices presented to the user is  
 limited to the number of actuators of the input device. By limiting the number  
 25 of selectable choices in this way, the device allows any selectable choice to  
 be made with minimum user input.

The present invention may also be implemented to allow full or partial control  
 of a portable radiotelephone, thereby eliminating the need for a data input  
 30 keypad.

According to another aspect of the present invention, there is provided a  
 method for controlling a user interface to select an item from a predetermined

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set of items, the user interface comprising an input having a plurality of actuators, and an output; the method comprising: controlling the user interface to provide a first menu selection comprising a plurality of items not exceeding the number of actuators; in response to operation of the actuators, selecting the item from the menu associated with the operated actuator; controlling the user interface to provide a further menu selection in response to selection of an item, at least one item of the further menu selection representing a subset of the selected item.

#### 10 Brief Description of the Drawings

The present invention will now be described, by way of example only, with reference to the accompanying drawings, in which:

Figure 1 is a diagram showing a representation of the directional input controls of a joystick input device;

Figure 2 is a diagram showing a typical character set for use with a portable radiotelephone;

Figure 3 is a diagram showing an arrangement of menu items and submenus according to one embodiment of the present invention;

Figure 4 is a diagram showing a further arrangement of menu items and submenus according to a further embodiment of the present invention;

Figure 5 is a block diagram showing a portable radiotelephone according to the present invention;

Figure 6 is a flow diagram showing an example of how the controller of Figure 5 operates according to one embodiment of the present invention; and

Figure 7 shows a number of portable radiotelephones incorporating the present invention.

#### Detailed Description of the Invention

Figure 1 is a diagram showing a representation of the directional input controls of a joystick device having nine defined positions 100 to 108. The

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Once a block is selected, the first menu screen is replaced by a submenu screen. The contents of the submenu screen are dependent on the previous block selected. If, in the above example, the block 308 was selected, the  
5 subscreen 2 as shown in Figure 3c will be presented to the user. Each of the blocks of submenu screen 2 represent individual characters. To select a character, the joystick device is moved in the direction of the required character to highlight the appropriate block. Once the required block is highlighted, it may be selected as described above. Once selected, the  
10 chosen character can be added to a text message, to enable a textual message to be constructed. The selection of lower-case characters may be implemented by a separate 'shift' key, or they may be represented as individual characters as described above. In an alternative embodiment, the portable radiotelephone displays the first character selected in upper case,  
15 and subsequent characters in lower case until a full stop is selected, in which case the next character selected would be displayed in upper case and so on.

Figures 3b to 3i show examples of a number of submenu screens which may be used according to the present invention. Using the selection methods  
20 outlined above, it is clear how any character from the character set shown in Figure 2 can be selected using only two joystick movements. This provides both a quick and an accurate way of inputting alphanumeric characters to a device such as a portable radiotelephone. Through practice, a user may quickly become adept in selecting the desired characters through appropriate  
25 joystick movements, much in the way that writing is learned. In particular, this method of data entry is particularly advantageous in portable radiotelephones which do not have a keypad, for example on very small or wearable devices, where the size of an incorporated keypad would be too small to operate using the fingers.

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Each of submenu screens shown in Figure 3 preferably include at least one blank block. Figure 3b, for example, shows the presence of a blank block in

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It is apparent that the techniques described above can be used for a wide range of uses, from constructing textual messages, to controlling the entire or partial functionality of a portable radiotelephone. Such a system could be used to replace the need for a keypad on a portable radiotelephone, with all control and data input effected by the joystick device.

Figure 5 is a block diagram showing a portable radiotelephone 500 according to the present invention. A display device 501 is used for displaying or presenting textual or graphical information to a user. In an alternative embodiment of the present invention, the display device could be

complemented by, or even replaced by, a speech synthesiser or other sensory means. The display device is connected to and controlled by a controller 502. The controller 502 accepts control signals from a joystick or other input device 503. The controller interprets the signals from the joystick device 503 which are made in response to information presented to the user on the display device 501. Optionally, a keypad 506 may also be connected to the controller 502. Such a keypad may be used for the inputting of further control signals, such as switching the portable radiotelephone on or off, or other typical functions found on such devices. A memory 504 is also connected to the controller 502. The memory 504 may be used to store, for example, textual messages constructed by the user, received messages from external users, user options, factory defaults etc. Finally, a telephone function module 505 is connected to the controller 502. The telephone function module 505 enables communication to be established with a telecommunications network, enabling calls to be made and received, textual or graphical messages to be sent or received, etc. The telephone function module 505 provides the typically functionality expected to found on a portable radiotelephone, as will be appreciated by those skilled in the art.

Figure 6 is a flow diagram showing an example of how the controller 502 of Figure 5 operates according to one embodiment of the present invention.

Step 600 causes a menu screen to be presented to the user, via the display device 401. In step 601, the controller 402 interprets movements made on the joystick device 403 to control the highlighting of menu items, as described above. The controller 402 decides when a selection of a menu item has been made according to the methods outlined above. Step 602 checks to see whether the menu or item selected has any associated submenu screens associated therewith. If a submenu screen is associated with the menu item selected, step 603 causes that submenu screen to be displayed. The user is then free to select an item from the submenu screen according to step 601. If, however, there is no submenu screen associated with the item selected, step

604 causes the function represented by the selected menu item to be performed, or selects the data represented by that menu item. The process is then repeated.

- 5 Although the present invention is described above with reference to one level of subscreen, it will be apparent that any number or arrangement of submenu screens could be used, providing that the lowest level of subscreen allows selection of a single character, number or function etc. In this way, complex character sets, such as Chinese, can be quickly and easily be used.

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